Garden to Plate: Food Safety for School and Community Gardens

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Introduction

Kids and families who grow their own produce are more likely to eat the fruits (and vegetables) of their labor.

Because gardening is an effective strategy for healthier food consumption, the number of school and community gardens is increasing across the state of Kansas. However, fresh produce has also been linked to outbreaks of foodborne illness.

Fruits and vegetables can be contaminated any time from planting to eating. Most pathogens are killed by cooking, but they are very difficult to wash off produce that will be eaten raw. To minimize contamination risks, this fact sheet outlines good practices for growing produce that school and community volunteers can take to keep their produce safe. These prevention strategies include:

- site and soil selection,
- personal hygiene,
- sanitation and tool safety,
- water and irrigation,
- compost and fertilizers,
- pest and animal management, and
- food safety in harvest and storing produce.

Site and Soil Selection

Selecting a suitable site will help reduce the risk of unforeseen problems such as flooding, animal crossings, chemicals and other contaminates in the soil, and runoff. Obtain the history of the land and ask community experts such as your K-State Research and Extension agent for help. To locate your local extension office, visit www.ksre.k-state.edu/about/stateandareamaps.html.

Know the history of the garden site to reduce risk of future problems.

Produce should be planted away from the following hazards:

- Garbage
- Animal pens
- Manure or compost piles
- Locations of potential water runoff
- Septic systems
- Areas with high risk of flooding
- Areas with a history of lead paint or possible heavy metals contamination

For raised-bed gardens, avoid using these materials:

- Pressure-treated wood
- Used tires
- Single use plastics
- Old railroad ties

Dial 811, the national "Call Before You Dig" number, to avoid digging into any utility lines when tilling a garden for the first time.

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Personal Hygiene

Good personal hygiene is essential in preventing foodborne illness and should be constantly reinforced, especially with children.

- Always wash your hands thoroughly any time they may become contaminated, such as after using the bathroom, touching garbage, or handling animals.
- Wash hands with clean, soapy water for at least 20 seconds. Use a nailbrush to remove soil from under fingernails. Dry with a clean paper towel.
- If water is not available at the site, gardeners should use disposable, single-use gloves when harvesting.
- No one should work in the garden while sick! Stay out of the garden if you are vomiting, have diarrhea, or a fever.
- After handling compost or touching the compost bin, do not touch tools or produce without removing gloves that may have touched the compost area and washing hands.
- Change out of dirty clothes and shoes before entering food preparation areas or the kitchen.
- Cover cuts and wounds on your hands with bandages and gloves.

Sanitation and Tool Safety

Wash your hands often when handling the edible portion of produce or any equipment that may touch the edible portion. Clean garden tools and surfaces with soap and clean water before and after each use.

Use food-grade containers when collecting, transporting, or storing garden produce.

Water and Irrigation

Contaminated water will contaminate edible produce. Only use potable or drinkable water to water the edible produce in your garden.

If you won't drink the water, don't use it to water your edible plants.

Know your water sources:

Potable water is clean, safe to drink, and free of pathogens. Example: Treated water from a municipal water supply.

Groundwater is less likely to contain pathogens and pollutants than surface water.
Example: Well water

Surface water is likely to contain pathogens and it may contain wastes, fertilizers, pesticides, and chemicals.
Example: Lakes, rivers, ponds, streams, and wetlands.

Rainwater collected from storm water runoff from roofs could be contaminated with bird feces from the roof or any chemical compounds in the roofing material. The storage tank may also be contaminated.
Example: Water collected in a rain barrel.

If the garden is already using an untreated water source, such as a river, pond, or rain barrel, be sure to have the water tested regularly,[1] including water captured from rain barrels and cisterns.

Contaminated or untreated water may contain pathogens that can cause human illness such as the hepatitis A virus, *Giardia*, *Shigella*, *E. coli*, *Salmonella*, *Cryptosporidium*, *Toxoplasma*, and norovirus. (For more information on food safety pathogens, visit www.cdc.gov/foodsafety/diseases/index.html)

For information on safe well water, visit www.kdheks.gov/envmicro/testing_of_private_wells.htm. More information on water testing for produce safety is available from: www.ksre.k-state.edu/foodsafety/produce/guidance/index.html#water-testing.

Irrigation:

- Trickle (or drip) irrigation that waters at the base of plants will minimize the risk of contamination. Hand watering at the base of the plant will also work when drip irrigation is impractical or cost prohibitive.
- Avoid overhead watering to reduce contamination of the plants with potential foodborne pathogens. In particular, avoid having the irrigation water touch the edible portion of the crop.

Compost and Fertilizers

Compost: a mixture of soil and decayed organic matter that improves garden and potting soil.

[1] List of private labs that test water for produce safety is available from: www·ksre·k-state·edu/foodsafety/produce/guidance/docs/water_testing_labs_Nov2017·docx

Composting

Composting is a great way to reduce the waste that goes into landfills and add needed nutrients for plants. New compost piles can be started with shredded leaves, yard trimmings, and fruit and vegetable scraps, depending on what material is available.

Compost must reach a minimum temperature of 131˚F for at least 3 consecutive days to kill pathogens such as *E. coli* and *Salmonella* before using it in the garden. Harmful pathogens may grow and live in compost piles maintained below this temperature. Compost piles that are at least 27 cubic feet generally reach this temperature. If compost piles are small, turn the pile regularly. When turning a compost pile, the pile must reach a temperature of 131˚F for a total of at least 15 days (does not have to be consecutive), with a minimum of 15 turnings. Add coffee grounds and grass clippings (pesticide and herbicide free) to increase the temperature. Use a compost thermometer (long stem, 2 to 3 feet, found in gardening stores or online) to check the temperature of your compost pile.

Place the compost pile away from garbage and water-runoff areas. Compost piles should have walls, fence, or some sort of barrier to keep animals out. Meat scraps or dairy product waste are not recommended for the compost bin.

Manure may be used but should be composted to avoid contaminating the garden with *E. coli* and other pathogens. Only use manure from herbivores such as cattle or rabbits. Do not use manure from cats and dogs. If the garden accepts compost from another source, it is imperative to ask what kinds of materials are in the mixture and if it was properly handled for safety.

If manure is used, extra steps must be taken to guarantee the safety of the finished compost:

- Do not use raw manure in your garden because it may contain *E. coli*. Students should not touch raw manure in the garden for their own health. It could contaminate produce grown in the garden unless there is at least a 120-day (4-month) interval between manure application and harvest.
- Mix the compost regularly as it is important for aeration and ensures the entire pile has reached the required temperature.
- Ensure that the compost pile has maintained a temperature of at least 131˚F for at least three days to ensure that any growth of pathogens is inhibited (particularly if raw manure was included in the compost).

Wear gloves and nose-mouth masks when handling compost. For quick composting tips, visit https://www.bookstore.ksre.ksu.edu/pubs/MF3372.pdf

Fertilizers

- Before fertilizing, have the soil tested to see if nutrients and fertilizer are needed. Contact your local extension office for more information.
- Read and follow manufacturer's instructions when using and disposing of fertilizer.
- Keep fertilizers in a locked storage area.
- ONLY allow trained adults to handle fertilizers.
- If transferring fertilizer to a different container, label it clearly with the common name of the fertilizer:
- Never use a food container!
- Keep original labels that specify usage, storage, cautions, etc.

Pest and Animal Management

The United States Department of Agriculture recommends not using any pesticides or herbicides in school gardens because of the potential health hazards to children. Community garden sites may also want to limit or avoid their use.

Using integrated pest management methods can control damage to food crops. Control weeds, for example, by mulching, hand-pulling, or using weeding tools. For more information, contact your local extension office.

Wild animals, farm animals, and even domestic pets can bring pathogens and contaminants into your garden. Use fencing to keep them out. Otherwise, use approved repellents or sprays.

- As a rule of thumb, wash hands thoroughly before and after touching or feeding animals.
- Do NOT forget to wash your hands AFTER caring for animals and BEFORE handling garden equipment or produce.
- Create some kind of barrier so animal feces cannot contaminate garden produce (this may mean removing animals during the growing and harvesting season).

- Never harvest produce when there is evidence of animal feces or bird droppings.
- If you do decide to use pesticides or fungicides, use potable water and keep sprayers clean and dry between uses.
- Avoid using pesticides or herbicides around children.

Food Safety in Harvesting and Storing

- Wash your hands often.
- Wash food-grade harvest and storage containers with soap and water. Sanitize and let air-dry between uses. Check with foodservice staff for their sanitation procedures or make up your own sanitizer using 1 tablespoon of unscented bleach to 1 gallon of water.
- Clean and sanitize sinks, counters, cutting boards, and utensils before preparing any food.
- Shake or rub off all excess garden soil or debris before bringing garden produce into the kitchen. A staging area for pre-cleaning and sorting is helpful to keep soil and food waste out of the kitchen.
- To slow post-harvest mold and rotting, most produce should not be washed before long-term storage.
- Do not submerge produce into water that is more than 10 degrees cooler than the temperature of the produce. Contaminants can be absorbed through porous tissues (e.g. stem scars of produce) when large variations in temperature occur.
- Wash and sanitize cutting boards, dishes, utensils, and countertops with hot water and soap between preparation of raw meats and garden produce.
- Always use potable or drinkable water to wash produce. Note that washing produce does not remove pathogens, but mainly removes soil and chemicals. Prevention of contamination is the best defense against food-borne illness!
- Keep raw produce separate from other foods such as meat, poultry, and seafood.
- Thoroughly rinse all produce immediately before eating, cutting, peeling, and cooking.
- Scrub rough peels and rinds with a vegetable brush.
- Discard any bruised or damaged pieces of fruits and vegetables.
- For fruit and vegetable storage guidelines, see "Recommended storage temperatures for fresh produce for safety and quality"—www.ksre.k-state.edu/foodsafety/topics/doc/storing%20fresh%20produce_handout_June2014_1page.docx
- For refrigerated produce, store in a refrigerator that is between 35° to 40° F.
- Refrigerate all cut or peeled produce in airtight containers.

An extensive resource list is available in the leader's guide for this lesson, MF3153.

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